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b. The highways necessary to serve traffic requirements in important war-time industrial areas.

For convenience, roads which are needed in the vicinity of military posts and concentration centers are called access roads. In many instances these are inadequate in number and far below the standards that are needed. As a rule they are comparatively short in length and inexpensive to construct. Their construction not only would facilitate troop training but also would diminish traffic hazards in congested training centers. The War Department recommends that the state highway authorities and the Public Roads Administration give consideration to the construction of these essential access roads.

With respect to highway facilities in important industrial areas, the War Department has informed the Public Roads Administration concerning the probable industrial load which it estimates will be generated by wartime procurement. This, translated into the probable increase in highway traffic, should provide you with information for use in connection with highway-development programs in those areas.

To summarize, from the military viewpoint:

First, existing deficiencies in the strategic system should be eliminated.

Second, projects for the construction of essential access roads deserve favorable consideration.

Third, highway facilities in important industrial areas should be adequate to meet the highway-traffic requirements of wartime industrial procurement.

The Federal Highway Act of 1940, which authorizes the Commissioner of Public Roads to give priority to and to expedite projects for national defense, provides a sound basis for accelerating the construction of access and strategic roads. It is recognized, however, that the attainment of our objectives, with respect to highway development, will span a period of several years at the present rate of progress.

ACCOMPLISHMENTS OF THE PAST FOUR YEARS

T. A. Dicus,
Former Chairman,
State Highway Commission of Indiana

We in Indiana have prided ourselves upon the progress that we have made in the development of our road system and upon the sound financial policies that provide funds for the further development and maintenance of this motor transportation system. We have been, and we are today, fully justified in that pride.

Indiana today has a system of state highways, county roads, and city streets that equal if they do not surpass the road transportation facilities of all other states, whether the comparison is based on an adequate mileage to serve the needs of the motorists, on the modernization of these roads, or upon the financial and administrative policies that guide their development.

And yet we who have some knowledge of the present-day traffic needs realize that, in spite of the progress which we have made, Indiana's motor transportation system is far from complete or even adequate for the growing traffic volume it carries. If we had any idea that our job as road-builders was complete, the constant stream of delegations and petitions seeking the construction of new roads and the further development of existing roads would soon disillusion us.

You who are now concerned with the administration of the state highway system, the county road systems, and the miles of city streets must face a growing problem, balancing on one side the demands of the motorist for road and street improvement against the tax which he is willing to pay to obtain such improvements. This is not a new problem. It has existed from the day when the man who wanted a trail through the wilderness was forced to pay through his own labor for such a trail.

IMPACT OF NATIONAL DEFENSE

But the problem is more serious today, for the ordinary, normal development of our roads and streets is being interrupted by the program of military preparedness which this nation has assumed to safeguard its future. You in the counties and the cities have not as yet come fully to face with this problem, but I can assure you that it is one of the major responsibilities that have been assumed by the State Highway Commission. Let me explain briefly just how the national defense program has already handicapped the work of the Commission.

For months there has been a steady stream of engineers from the employment of the Commission into the defense industries which are being set up in this and other states. The Commission was already experiencing difficulty in getting surveys made, plans prepared, and construction work supervised by competent engineers—a result of the personnel lost after the budget reductions imposed by the General Assembly in 1939. With the loss of more than a hundred experienced engineers during the year and of others leaving since the first of the present year, the situation which the new Commission is facing is acute. If present conditions continue—the taking of the engineers who are necessary for road and bridge construction for military service and for defense industries—

highway development in the state, counties, and cities may be appreciably retarded.

The State Highway Commission has inherited another problem, also a product of the national defense program. At the present time the Commission has before it a list of highway improvements that are considered necessary to place the state highways in suitable condition for military needs. It is estimated that this work alone will cost approximately three million dollars, and there is no assurance that other projects will not be requested as a part of the defense program or any assurance that additional funds will be provided.

HIGHWAY FINANCING

At the present time the General Assembly is in session. During the campaign and since there has been considerable discussion of various proposals affecting the financial basis of our road and street funds. In the twenty-two years that have elapsed since the state highway system was established, we have arrived, through considerable experimentation and study, at a system of fees based on road use. In other words, we have in Indiana today for highway financing what approximates the toll system of our grandfather's generation—the road user pays in proportion to his use of the road. Naturally there is objection to such a system, as there always is to any tax imposed.

Tabulation of reports from every state, published by the American Association of State Highway Officials, show that in Indiana the amount paid for state highways through license fees, gasoline taxes, and other imposts is lower per vehicle registered than the national average and lower than the averages for 34 other states. In view of that showing, there is no evidence that Indiana motorists are penalized for the construction and maintenance of roads and streets.

I call your attention to proposals now before the General Assembly which would affect the funds available for a continuation of the necessary improvement of our motor transportation system. It is your responsibility to see that the members of the General Assembly and the motorists of the state realize, before any legislation is enacted, the effect that it will have on construction and maintenance. No group of highway users should be permitted to escape payment of their just share for use of the highways or to shift these costs to others. The motorists must be brought to realize that the only funds for road construction and maintenance are derived from the license fees and the gasoline tax. They must realize that when they demand improved roads, new bridges, and other modern services from their roads, these improvements add to the cost of the roads and they must be prepared to pay for the improvements. That is true whether the improvement sought is on a state highway, a county road, or a city street.

FOUR YEARS OF HIGHWAY SERVICE

I realize that my remarks thus far have been wholly unrelated to the subject I was assigned for this program. I hope that you will realize that having been actively connected with the administration of the state highway system for the past several years, I have a sincere appreciation of the highway problems which the Commission, the counties, and the cities face—especially under present conditions and those which we can foresee in the immediate future.

It was four years ago, as a newly appointed member of the State Highway Commission, that I attended my first session of the Purdue Road School. Then and during the succeeding years I have found these programs a source of inspiration and an opportunity to become more familiar with the special problems that are faced by the counties and the cities. I know that other members of the Highway Commission and its staff have the same appreciation for the opportunities of discussing mutual problems which are possible only in such a gathering as this.

As I look back now over the past four years, they seem to have been a period of transition in the history of the state highway system. After the establishment of the highway system in 1919, there was a period of expansion and construction climaxed by the extensive construction programs made possible during the last decade by increased funds and by special federal grants. During the past four years, there has been a growing feeling that in mileage the state highway system was nearing its maximum useful limits. There has been a similar feeling that the major task now was the adequate development of the present system, with such additions as might be found necessary, to provide a safe, convenient network of highways over which the motorist could travel at any season of the year.

During the past four years the Highway Commission has given attention to the salvaging of roads by resurfacing worn pavements where the base was adequate and where the alignment was satisfactory for present traffic and safety needs. The Commission has been subjected to bitter criticism as a result of this policy, but we feel that putting a road in good condition for additional years of use through resurfacing is better business than throwing away the investment that has been made and building a new road. The bickering between material interests over types of construction to be employed is not new in the history of the State Highway Commission nor in the counties and the cities.

But during the four years there were numerous accomplishments in the development and modernization of the state highway system. While the fiscal year under which the State Highway Commission operates does not correspond to the cal-

endar year, the fiscal year reports will serve to illustrate my remarks. In the four-year period from July 1, 1936, to June 30, 1940, mileage maintained by the State Highway Commission increased 709 miles. During this period the Commission received bids and awarded contracts for road, bridge, and maintenance work having a total cost of nearly forty-five million dollars. This included twenty-nine million dollars for roads; over nine million dollars for bridges having a length of over twenty feet; and about six and one-half million dollars for maintenance work such as resurfacing and surface treatment.

These contracts represent construction work on more than one thousand miles of roads, 298 structures having a total span length of six and a third miles, and the improvement of surfaces on more than twenty-two hundred miles of roads. In addition, contracts were awarded for improvement work on district and subdistrict offices at a cost of a half-million dollars.

These statistics show but one phase of the activities of the past four years. Four hundred miles of state highway routes in cities with a population of over 3,500 have been added to the system—bringing many new problems and responsibilities. Establishment of roadside parks and picnic tables is one of the comparatively new phases of state highway operation but one that has been enthusiastically received by the motorists of this and other states. In the past year the Commission has passed upon 986 road and bridge projects submitted for approval by 87 counties as required by a 1937 Act of the General Assembly. These projects had an estimated cost of two and a third million dollars.

The Highway Commission has co-operated in the activities of the Indiana Roadside Council, a group that represents more than one hundred thousand Hoosier women who are members of various statewide organizations. This council and members of the organizations represented, are an important force in the highway safety and roadside improvement programs.

Prequalification of contractors, another enactment of the General Assembly, has been administered by the Commission. At the end of the last fiscal year 182 firms and individuals had met prequalification requirements as bidders on state highway contracts.

The installation of flashing warning signals at railroad grade crossings, the development of the no-passing zone marking at points where sight distance is limited and the use of reflectorized paint for night visibility at such points, the development of a traffic engineering department to increase motoring safety, and similar steps have been taken in the past year.

We feel that the past four years have been years of advancement in the development of a state highway system that will best serve the traffic needs of the present generation while anticipating as far as possible the needs of the future.

FUTURE NEEDS

Speaking from this platform a year ago on the subject of Indiana's road system of the future, I ventured to suggest certain goals. I feel today that they are still worthy of the best efforts of the men who are in charge of our road systems and I repeat them in closing my remarks, quoting from the talk of a year ago:

"If then, we are to look into the future of the roads of Indiana we should expect to see among other things:

"A system of roads and streets, adequate for the traffic which they serve while contributing to the orderly, convenient, and safe movement of that traffic.

"A state highway system which serves as a primary artery carrying the major volume of traffic both interstate and intrastate.

"A system of county roads serving local, rural, and suburban traffic and acting as a secondary or feeder system for the state highways, and

"A system of city streets which are designed and maintained for the special type of traffic which they serve, differentiating between business and residential areas and uses."

At that same time I suggested the need for a broad, practical research program that would provide unprejudiced data to guide the future improvement, development, and extension of the road systems of the state. That suggestion has been carried out, as far as the state highway system is concerned, in a special report compiled by the State-wide Highway Planning Survey and listing needed road, bridge, and grade-separation improvements as a basis for a five-year construction program on the state highway system. I know that the data contained in that report will be of valuable service to the present Commission during the coming years.

There are many other phases of the state highway system and its operation which I should probably include in this discussion. The past four years have been busy ones; there have been discouraging days and days of encouragement as we faced the problems of highway administration. I cannot pay too high a tribute to the loyalty and the support which we have received from the members of the state highway organization, regardless of the capacity in which they served. The spirit of co-operation that exists in that organization and among you who represent the counties, the cities, and other

interests who made up the road-building organization in Indiana, augurs well for the future of Indiana's roads and the development of a road system which returns full value to the motorist.

While it is but natural to experience a feeling of regret that we are no longer directly concerned with the administration of the state highway system, I take this opportunity to congratulate the motorists of Indiana upon the Commission which has taken up the responsibilities of the state highway system. It is a tribute to the public spiritedness of these men, each experienced in highway affairs and successful in private business, that they give their time and their efforts to the continued development of the highway system.

COOPERATIVE HIGHWAY RESEARCH—A REALITY

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Director of Joint Highway Research Project,

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The Joint Highway Research Project was established in January, 1936. During the five years since then the idea of performing research on highway materials has developed from paper plans to a modern research organization producing results comparable with those in large industries. In this brief presentation an attempt will be made to give a short historical sketch of the Joint Highway Research Project showing the functions of the Advisory Board, the staff organization, the functions of the Project as representing the State Highway Commission of Indiana and Purdue University, and a brief statement of progress of the researches already undertaken.

At the 1936 Purdue Road School the members of the State Highway Commission of Indiana, Messrs. James D. Adams, John Wheeler, and Evan B. Stotsenburg, discussed the possibilities of performing research on highway materials at Purdue University with various representatives of the University. Many conferences followed, and eventually a skeleton organization was established under a twenty-five thousand dollar allotment of funds from the Commission. These funds were spent entirely under the direction of the Commission. A small Advisory Board was appointed consisting of Messrs. M. R. Keefe, Chief Engineer; A. R. Smith, Engineer of Tests, and M. J. Stinchfield (deceased), Field Engineer of Bituminous Construction representing the Commission, and Professors C. A. Ellis, W. K. Hatt, and B. H. Petty (Chairman) representing the University.